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GB 0301580

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(71) Applicants

Delson and Company  
Limited,  
Latimer Road,  
Alvechurch, Birmingham,  
B48 7NR

(72) Inventor

Patrick Gordon Innes

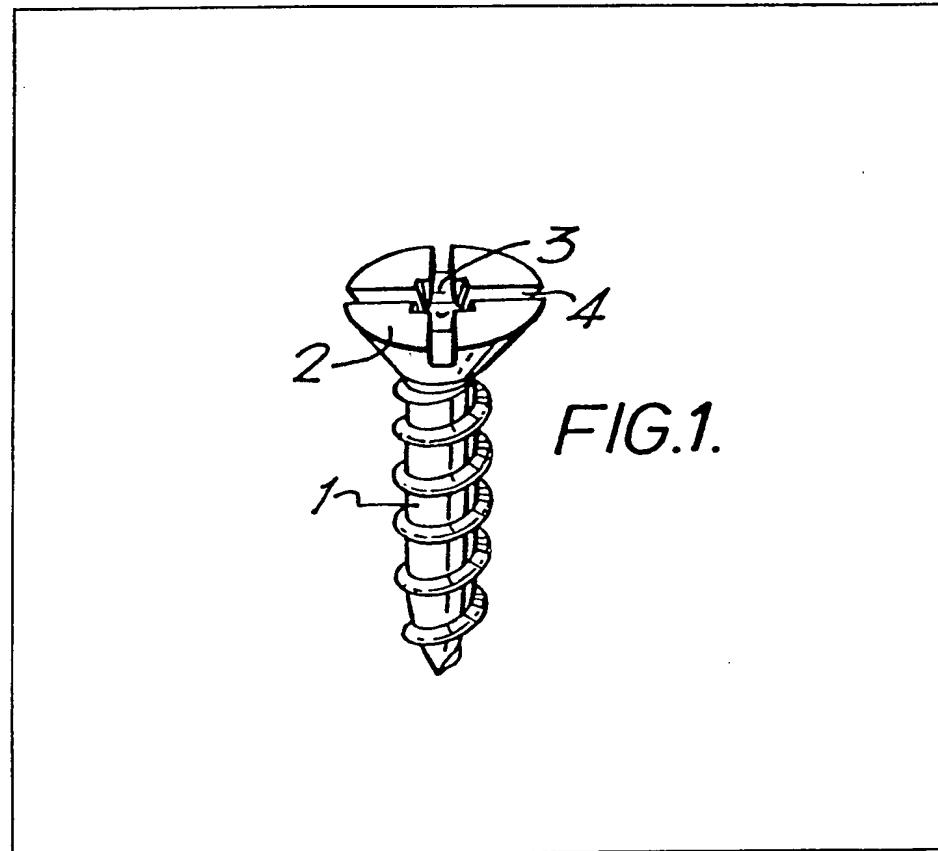
(74) Agent

Audrey E. Knowles,  
624 Pershore Road, Selly  
Park, Birmingham,  
B29 7HG

## (54) Improvements in screws and fasteners

(57) In a screw or fastener having a head 2 with a recess drive formation 3 of known cruxiform shape, an alternative or additional drive formation is provided by a cross slot 4 which is superposed on the recess and aligned therewith. The two slot

portions of the cross slot each extend across the entire diametric width of the head. The cross slot provides the alternative or additional drive by a traditional flat bladed tool or bit. Furthermore, with the special tool or bit designed to drive the screw or fastener through the recess, angled drive may be achieved due to the clearance provided by the cross slot.



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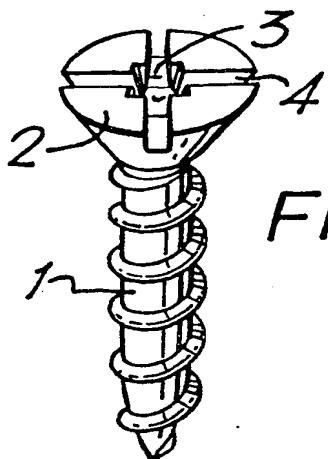


FIG.1.

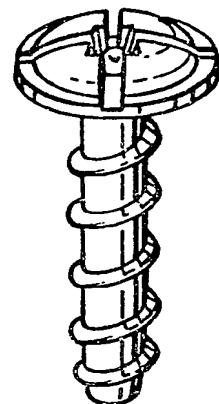


FIG.2.

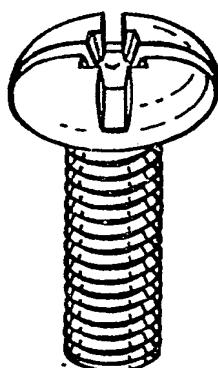


FIG.3.

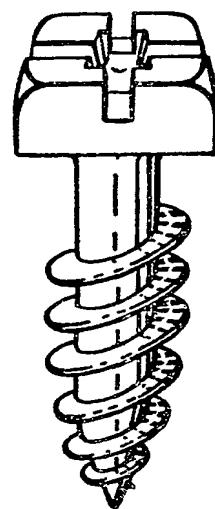


FIG.4.

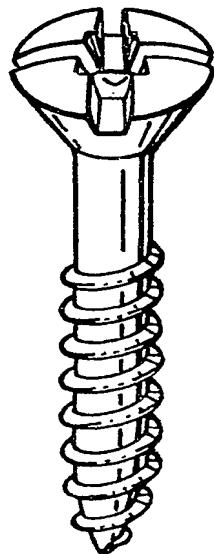


FIG.5.

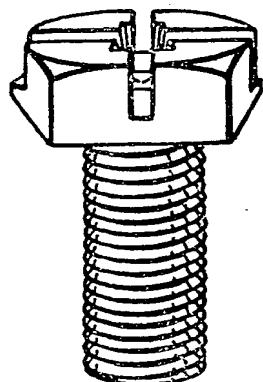


FIG.6.

## SPECIFICATION

## Improvements in screws and fasteners

This invention concerns improvements in screws and fasteners and is particularly concerned with screws and fasteners having recess drive formations for driving the screw or fastener.

In screws and fasteners, there are a wide range of recess drive formations in current use, some of these being proprietary and called by various names (some of which are Registered Trade Marks) such as 'Phillips', 'Posidriv', 'Supadriv', 'Frearson', etc. As well known, each of these recess formations is generally of special cruxiform shape and special tools or bits are required to drive the screws or fasteners.

Although there are advantages in providing recess drive formations in screws and fasteners, many practical problems arise. One common problem is the need to provide or have the right tool or bit to use with the screw or fastener, and whereas in mass manufacture such correct tool(s) is(are) made available for original assembly, on subsequent disassembly possibly for servicing or repair, the right tool(s) may not be to hand. As a result, either disassembly is precluded or the attempt to force the screw or fastener with the incorrect tool spoils the original recess formation so that the screw or fastener cannot be removed or re-used. This problem is particularly prevalent for handymen or do-it-yourself enthusiasts.

Arising from the continual increase in the range of different recess drive formations applied to screws and fasteners, the demand for stock-holding of a wide range of types, each having various head forms, threads and sizes, is becoming unreasonable costly for stockists.

Previously, it has been proposed to overcome the foregoing problem in a screw having a cruxiform recess with two slots providing a cross-shaped central recess by arranging for one of the slots to be longer than the other so that the longer slot extends across the head. However, in this proposal as described in U.K. Patent Specification No. 1,027,698 the head configuration is non-symmetrical and this leads to significant problems in mass manufacture.

An object of this invention is to provide a screw or fastener having an improved drive formation which overcomes the foregoing problems in a simple manner.

According to this invention, in a screw or fastener having a head formed with a recess drive formation of generally cruxiform shape there is provided a cross slot superposed on said formation with the cross slot being aligned with the cruxiform recess and wherein the two slot portions of the cross slot extend diametrically across the whole width of the head and extend normally to each other.

By superposing a cross slot on the cruxiform type of recess drive, the screw or fastener can be driven through a selected one of the cross slot portions either by a standard flat bladed driver or by the specific tool or bit for the recess. This

avoids the important problem aforementioned of special tools or bits as the traditional flat bladed driver still dominates as a common tool.

The screw or fastener according to this invention may have any of the standard and conventional head forms such as pan or round, counter-sunk (flat or raised), square, hexagonal, etc. With each such head form, the cross slot extends diametrically across the entire head with the intersection at the centre being co-axial with the shank or threaded part and aligned with the wings of the recess. Such wings usually extend transversely and normally to each other and by providing the superposed cross slot, there is no interference between the slot and the recess. The

side faces of the wings, through which driving of the screw or fastener is achieved are not obstructed or reduced by providing the cross slot.

In the screw or fastener according to this invention, surprising advantages in driving through the recess formation are achieved. The cross slot

provides extended recesses or channels in the head of the screw or fastener and these are each aligned with one of the wings of the recess. Due to this, a clearance is provided opening to the recess

enabling angled driving of the screw or fastener by the tool or bit fitted into the recess but inclined to the axis of the screw or fastener.

Additionally, in driving a screw or fastener according to this invention, the user can select the tool or bit from those available or by which the screw or fastener can be driven. This option enables dual driving methods to be employed, or even triple methods where the head form of the screw or fastener is square or hexagonal. If the recess formation is damaged or not serviceable for some other reason, the screw or fastener is still serviceable due to the provision of the cross slot.

In the manufacture of screws and fasteners according to this invention, especially having regard to the substantial quantities in mass production, savings of materials can be realised in significant amounts. Furthermore, by providing the dual form of head formation, the range of types of screws and fasteners to be manufactured can be reduced.

Following the above advantage, stock-holding requirements can be reduced with considerable savings both in costs of storage and stock value.

In manufacturing screws and fasteners according to this invention it is notable that mass manufacturing techniques such as a multi-blow, high speed horizontal forming press with suitable die and punch or like tools sets, and such techniques can be employed for the wide range of head forms as previously mentioned.

This arises due to the symmetrical form of the superposed cross slot which is aligned with the axis of the threaded shank. In the said prior proposal of the cruxiform recess having a single long diametric slot extending across the entire width of the head, the only type of head described is that known as a cheese-head. There is no disclosure of how this is to be made, and it is our finding that where such a head is produced in a

die, complex tooling is required to compensate for the non-symmetrical displacement of the material caused by the different lengths of slots in the head.

5 Accordingly, this invention provides significant advantages and merits to the user, the stockist and to the manufacture of screws and fasteners.

In order that this invention be understood, various exemplary embodiments are depicted in 10 the accompanying drawing to which reference will now be made.

Figure 1 depicts a screw having a threaded shank 1 and a flat counter-sunk head 2. A recess 3 of the cruxiform type is provided in the head 2, 15 and in superposed aligned relationship, the head is formed with a cross slot 4. The cross slot 4 extends across the head diametrically to permit driving by a standard flat bladed driver by selecting one of the diametric extents of the cross 20 slot. Alternatively, the screw may be driven by a suitable driver through the recess 3.

Other examples of this invention are depicted in the drawing as applied to other types of screws or fasteners as follows.

25 Figure 2 depicts a flanged head screw.

Figure 3 depicts a pan or round head grub screw.

Figure 4 depicts a square head screw.

Figure 5 depicts a raised counter-sunk screw.

30 Figure 6 depicts a hexagonal headed bolt or set screw.

In each of the examples of Figures 2 through to 6, the head has the recess formation therein with a cross slot superposed in aligned relationship 35 therein.

From the exemplary range of screws and fasteners given, it will be understood that the invention may be applied to virtually all types and kinds of screws and fasteners. The size of the 40 cross slot is selected in accordance with the respective size of the head, recess drive and the type of screw or fastener. Such selection may be based on known criteria.

In the manufacture of a round or pan head 45 screw or fasteners, the head form can be produced by a horizontal multi-blow high speed press in which the head is produced outside the die and formed by a reciprocating punch defining the head form and including the male form of the recess 50 together with the diametrically extending slot portions of the cross slot extending fully across the head profile form. As the material from which the

fastener is being formed is deformed during the press blows of which two are normally required,

55 the material is displaced uniformly due to the symmetrical configuration of the cross slot. There is no tendency for the head to be of oval shape and no compensation for ovality has to be made in the tool set.

60 In the manufacture of countersunk and raised countersunk head screws or fasteners, the head form can be produced in the die with the symmetry again ensuring that ovality is avoided.

65 Likewise other head forms can be produced by suitable die and punch sets.

As will be appreciated by a manufacturer of screws and fasteners, in the displacement of the material of the head, due allowance has to be

70 made for the reduction of the material by providing the cross slot superposed on the conventional recess shape. The effect of this is that the quantity of material of the head is less than that of the same head without the cross slot 75 and by this less material is employed. In the mass manufacture of screws and fasteners, this represents a substantial saving in material and economies in manufacture.

Other merits and advantages of this invention

80 will be understood by those familiar with this subject and methods of manufacture.

#### CLAIMS

1. In a screw or fastener having a head formed with a recess drive formation of generally

85 cruxiform shape, a cross slot is superposed on said formation with the cross slot being aligned with the cruxiform recess and wherein the two slot portions of the cross slot extend diametrically across the whole width of the head and extend 90 normally to each other.

2. A screw or fastener according to claim 1 wherein the intersection of the slot portions of the cross slot is co-axial with the shank or threaded part of the screw or fastener.

95 3. A screw or fastener according to claim 1 or Claim 2 wherein the cross slot is of a width and depth so as not to obstruct the recess drive formation.

100 4. A screw or fastener substantially as hereinbefore described with reference to the exemplary embodiments depicted in the accompanying drawing.